CLAIMS

1. An integrated optical device comprising:

a first and a second integrated waveguides **(201,203)** arranged so as to be in optical coupling relationship in a first and a second spaced-apart coupling regions **(205,207)**, and having respective optically uncoupled waveguide sections **(209,211)** in between the first and second coupling regions, and

a first and a second modulated refractive index structures **(223,225)**, each one formed along a respective uncoupled waveguide section and comprising at least one pair of regions **(403,401)** having a first refractive index n_1 and, respectively, a second refractive index n_2 greater than the first, said regions being adjacent to each other along the respective waveguide section,

characterised in that

said regions of mutually different refractive index comprise a portion **(403)** of the respective uncoupled waveguide section and a gap **(401)** formed in the uncoupled waveguide section, the percentage difference $\Delta n = 100 \times (n_2/n_1 - 1)$ [%] between said first and second refractive indexes being greater than 1.5 %.

2. The integrated optical device according to claim 1,

wherein said percentage difference is greater than 10 %.

3. The integrated optical device according to claim 2, wherein said percentage difference is greater than 50 %.

4. The integrated optical device according to claim 1, wherein said first and a second integrated waveguides each comprise a core and a cladding, said gap **(401)** extending at least across the entire cross-section of the core of the respective waveguide section.

5. The integrated optical device according to claim 1, in which an interface between said regions of mutually different refractive index is arranged orthogonally to the light propagation direction in the respective uncoupled waveguide section.

6. The integrated optical device according to claim 5, in which the first and second modulated refractive index structures comprise each a plurality of pairs **(C;C1-C15)** of regions of mutually different refractive index, arranged in succession along the respective uncoupled waveguide section.

7. The integrated optical device according to claim 6, in which at least one of said plurality of pairs of regions

is a transmissive pair **(C1,C4,C8,C12,C15)**, for transmitting optical signals with wavelengths within a prescribed wavelength pass band **(PB1,PB2)**, the remaining pairs of regions **(C2,C3,C5-C7,C9-C11,C13,C14)** being reflective pairs, for reflecting optical signals with wavelengths within a prescribed wavelength stop band **(SB)** containing the pass band.

8. The integrated optical device according to claim 7, in which said pass band corresponds to at least one prescribed channel **(S(λ1), S(λ2),…)** of a wavelength division multiplexed signal **(S_m{S(λ1), S(λ2),…})**, and said stop band is at least as wide as an overall wavelength spectrum region occupied by the wavelength division multiplexed signal.

9. The integrated optical device according to claim 7 or 8, in which said plurality of pairs of regions comprises two or more transmissive pairs, distributed among the reflective pairs, for transmitting optical signals with wavelengths within a prescribed wavelength pass band **(PB1,PB2)**, the remaining pairs of regions **(C2,C3,C5-C7,C9-C11,C13,C14)** being reflective pairs, for reflecting optical signals with wavelengths within a prescribed wavelength stop band **(SB)** containing the pass band.

10. The integrated optical device according to claim 9, in which all the transmissive pairs have a same optical length in the light propagation direction.

11. The integrated optical device according to claim 9, in which the transmissive pairs have varying optical lengths (d1+d2) in the light propagation direction.

12. The integrated optical device according to claim 10 or 11, in which a number of reflective pairs between adjacent transmissive pairs varies along the respective waveguide section.

13. The integrated optical device according to any one of claims 7 to 12, in which the optical coupling regions have optical coupling factors approximately equal to 50%.

14. The integrated optical device according to claim 1, in which the first and the second modulated refractive index structures are located along the respective uncoupled waveguide section in substantially identical positions with respect to the first coupling region.

15. The integrated optical device according to any one

of claims 7 to 14, in which the first waveguide has a first input section (**207**), adjacent the first coupling region, and the second waveguide has a first and a second output sections (**211,213**), respectively adjacent the second and the first coupling regions, and the device comprises:

a first optical path from the first input section to the first output section, the first optical path propagating from the first input section to the first output section a first optical signal (**$S(\lambda 1)$**) with wavelength in said pass band;

a second optical path from the first input section to the second output section, the second optical path propagating from the first input section to the second output section a second optical signal (**$S_{out}\{ S(\lambda 2),\ldots\}$**) with wavelength in said stop band but outside the pass band.

16. The integrated optical device according to claim 15, in which the first waveguide further comprises a second input section (**209**), adjacent the second coupling region, and the device comprises a third optical path from the second input section to the second output section, the third optical path propagating from the second input section to the second output section a third second optical signal (**$S'(\lambda 1)$**) with wavelength in said pass band.

17. An integrated optical add/drop device adapted to receiving an input wavelength division multiplexed optical signal (S_m(S(λ1), S(λ2), S(λ3), S(λ4))) including at least a first and a second optical signals **(S(λ1),S(λ2),S(λ3),S(λ4))** differentiated by their wavelength bands and selectively extracting the first and a second optical signals from the input wavelength division multiplexed optical signal, characterised by comprising at least a first and a second integrated optical devices **(1011-1014)** in accordance with claim 14 connected in cascade and having differentiated pass bands, corresponding to respective bands of the first and second optical signals.

18. The integrated optical add/drop device according to claim 17, in which the second output section of the first integrated optical device is coupled to the first input section of the second integrated optical device.

19. A process for manufacturing an integrated optical device, comprising:

forming on a substrate **(301)** at least a first and a second integrated waveguides **(201,203)** each comprising a core and a cladding, said waveguides being arranged so as to be in optical coupling relationship in a first and a second spaced-apart coupling regions **(205;207)** with respective

optically uncoupled waveguide sections **(209,211)** in between the first and second coupling regions;

forming along the optically uncoupled waveguide sections respective first and second modulated refractive index regions **(215,217)**, comprising each at least one pair of regions having a first refractive index n_1 and, respectively, a second refractive index n_2 greater than the first, said regions being adjacent to each other along the respective waveguide section,

characterised in that

said forming the at least one pair of regions comprises cutting away a portion of the respective waveguide section for defining a gap **(401)** between two adjacent portions **(403)** of the respective waveguide section, and

making the percentage difference $\Delta n = 100 \times (n_2/n_1 - 1)$ [%] between said first and second refractive indexes greater than 1.5 %.

20. The process according to claim 19, in which said cutting away is performed simultaneously in the optically uncoupled waveguide sections.

21. The process according to claim 20, in which said cutting away comprises using a mask defining a pattern of cuts to be formed in the optically uncoupled waveguide

sections, and selectively removing the optically uncoupled waveguide sections according to the pattern defined by the mask.

22. The process according to claim 19, further comprising filling said gaps with a substance having a refractive index different from that of the waveguide sections.

23. The process according to claim 22, in which said substance is air.